

# TWO FLUTED POINTS WITH RESIDUES

by

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Most American collectors are familiar with archaeological discoveries of stone implements in their original hafts. Within the United States the majority of these finds have been made in dry caves of the Southwest, Great Basin, and farther afield — Hawaii. Usually ancient implements were hafted with sinew or fine cord together with cement. Commonly used cements are pitch (plant resin), bitumen (tar), fish glue, and blood. Such compounds are tenacious, and traces of them can survive even on stone tools that have lost their original bindings.

Under certain conditions organic residues upon stone tools have endured at very old encampments fully exposed to the weather. A notable case is the “blood, pollen and sinew” on 13,000 year-old Clovis artifacts made of obsidian from the Dietz site, south-central Oregon (Fagan 1986). In the same region another Clovis encampment (Hoyt site) produced fluted points with tree resin (“amber”) adhering to fine scratches upon channel flakes (Tankersley n.d. and 1994). These scratches are thought to be intentional dulling of obsidian’s slick surface — thereby ensuring adhesion of a cement.

In a publication defending his use of the term “mastic” as applied to Clovis points from the Hoyt site, Tankersley describes three conditions under which organic residues upon stone tools are likely to survive in the archaeological record (1996: 456-457), namely: 1) burial within a wetland or bog; 2) deposition inside a dry cave; and 3) contact with “certain mineral salts.”

A fourth condition that is responsible for the survival of residues, particularly fluid ones such as blood, depends upon the micro-topography and raw material of an artifact itself. When some stones are flaked, removals may terminate with a hinge fracture. A very narrow crack extends into the artifact past the hinge. By capillary action, blood can creep into this crack, fill it and as it dries, seal it shut. If an artifact of translucent or transparent stone has been used for butchering, the blood within cracks, still reddish in color, is easily seen (Gramly 1991). Various attempts have been made to identify the animal species that were butchered leaving their residues within stone tools (Hyland et al. 1990), but outcomes have been only partially successful.

## **Salts that Preserve Residues**

Mineral salts, common in nature, that enable archaeological residues to be preserved are anhydrous/hydrated sulfates and sodium nitrate. Anhydrous sulfates

are barite (barium sulfate) and celestite (strontium sulfate). Foremost among the hydrated sulfates are gypsum (calcium sulfate + water), mirabilite (sodium sulphate + water), and epsomite (magnesium sulfate + water). The solubility of these salts is variable. Sodium nitrate, for example, dissolves readily and is seldom encountered outside the protected environment of a cave. Gypsum, on the other hand, can endure long-term exposure in some soils.

Mineral salts that occur free within North American caves (see for example White 1969) were important during both prehistory and the historic era. During the Civil War sodium nitrate was leached from cave sediments and used to make gunpowder; however, we can only speculate why ancient aboriginal groups wanted mineral salts from caves. Perhaps they were used as medicines? Whatever their use, there is clear evidence that salts were mined prehistorically. At Salts Cave, Kentucky it is thought that the principal purpose for going underground was to obtain gypsum and mirabilite (Watson 1969: 57).

Identification of the elemental composition of mineral salts in the archaeological record is straightforward using X-rays. A scanning electron microscope or an x-ray fluorescence apparatus is indispensable. Actual mineral identification, however, requires an X-ray diffractometer and a researcher with intensive training in mineralogy.

## **Two Fluted Points with Residues The first point.**

In the course of archaeological excavations at the Phil Stratton site, Logan County, Kentucky, we were visited by Tim Holder of Cadiz, Kentucky and his older relative, Alfred Holder, also of that state. They had been introduced to us through the good offices of ASAA Member Carl Yahnig of Christian County, Kentucky. Tim had a rare, intact Cumberland fluted point that had been discovered during the 1980s by Alfred on a farm near Oakville, Logan County — just a few miles north of the Phil Stratton site. In examining the point with Tim (Figure 1), I was intrigued to observe a dollop of gray-colored residue upon the one face near an ear (Figures 2 and 3). Alfred Holder had noticed this same residue on the day when he picked up the Cumberland point in a plowed field. Neither Tim nor I doubted that the encrustation was ancient. Curiosity had prompted Albert to remove a little of it, but fortunately he left most of the residue undisturbed.

The Cumberland point, which has been accurately rendered by artist Steve Wall-

mann (Figure 4), belongs to an hypothesized “Middle Cumberland stage.” This part of the Cumberland Tradition is well represented in southern Kentucky and throughout Tennessee. At the Phil Stratton site this stage has been absolutely dated at 14,500 calendar years before present (Gramly 2009).

The residue provided an unique opportunity to corroborate our estimated age of the Middle Cumberland stage; however, first it was necessary to remove nearly all the deposit in order to meet weight requirements for radiocarbon dating by tandem linear mass spectroscopy.

Before scraping away the residue, we photographed it using a scanning electron microscope (Figure 5). Myriads of small mineral particles sheathed by an amorphous organic binder (identified as “resin gum” with a RAMAN spectrometer) were evident. The particles appeared to be evenly distributed within the binder and did not lie just upon its surface. Elemental analysis with SEM X-rays suggested that the mineral was barium sulphate (Figure 6). This mineral salt certainly accounted for the preservation of the resin gum, which we hoped would provide enough carbon for a good date.

Alas, when the sample was combusted at Beta Analytic laboratories in Coral Gables, Florida, the amount of carbon was deemed insufficient for dating tandem linear mass spectroscopy. All that remained in the retort was a thick white coating — vaporized barium sulphate.

## **The second point.**

During our work with the Holder Cumberland point, I learned about another fluted point with organic residue at its base. This specimen — a Clovis point from Palestine, Liberty Township, Darke County, Ohio (Figure 7) — had been purchased from the original finder (name unknown) by Lloyd Hammontree who, in turn, passed it on to Tony DeRegnaucourt. Finally, it entered the collection of Elaine Holzapfel of Greenville, Ohio.

Despite the handling this Clovis point had experienced during its long history of ownership, a narrow stripe of dark reddish-brown material still remained across one ear (Figure 8, arrow; Figure 9 close-up). Use of a 10X hand-lens to scrutinize the residue revealed both fibers and impressions of fibers upon it. Some of these fibers resembled flattened threads of animal sinew (Figure 10); while, other more rounded ones (Figure 11) might have been plant material.

Peter Bush, director of the Instrumentation Laboratory at the University of Buffalo's Dental School, Buffalo, New York, tested the residue on the Clovis point using the same RAMAN spectrometer that had been used for the Holder Cumberland point. Its organic nature was confirmed instantly; however, we did not permit the infrared laser's vaporizing beam to focus upon the residue long enough for a more exact identification to be made. Had we done so, much residue would have been destroyed. Our primary goal was to date the residue — and by extension, the Clovis point. We could not afford to sacrifice any of our small sample.

The residue was red-brown in color and slightly translucent. It appeared to me to be plant resin or blood. Earlier, Tony DeRegnaucourt had expressed an opinion that it might be asphaltum. Indeed, rare asphalt seeps are known for Kentucky and elsewhere east of the Mississippi River (New York Times article, June 23, 1901) — any of which might have been used prehistorically. However, asphalt residues that I have observed archaeologically at sites on the Gulf Coast are black in color and not translucent — even in small pieces.

Confirmation that the residue upon the Clovis point in Elaine Holzapfel's collection was geologically "recent" and not asphaltum formed millions of years ago was provided by radiocarbon date Beta-273613. The narrow stripe of resin on the point's base furnished sufficient carbon for dating by tandem linear accelerator mass spectroscopy. At one standard deviation (68% probability), the calibrated ages of the residue were AD 1290-1330 and AD 1340-1400 (laboratory report dated 3/2/2010). These ages are expressed in calendar years. Clearly, they do not pertain to the time when the Clovis point was manufactured and first used. However, it is proof that ancient artifacts were sometimes picked up and re-used during a later era — in this case, at a time when Ohio's Ft. Ancient culture flourished.

How resin on this Clovis point survived 600-700 years is a question that cannot be answered since we know nothing about the circumstances of the artifact's discovery. Most likely it had lain within one of Darke County's many bogs that have been drained and brought under cultivation and was picked up by a lucky collector.

### Summary

Although analyses of residues upon two fluted points yielded unforeseen, and somewhat disappointing, information, the outcomes still justified any expense and claims upon our time.

In the case of the Cumberland point we now know that its ancient user kneaded together mineral particles, likely obtained within a cave, and an organic binder to

give cement that was not too tacky to handle. We recall an analogous practice of northeastern North American Indians who mixed charcoal with spruce gum to make patching material for birchbark canoes (see Thoreau's account of this practice in his book *The Maine Woods*).

And for the Clovis point from Darke County, we now understand that late in Ohio's prehistory no good piece of flint-knapping, whatever its age, went unused. Whether the Clovis point was re-hafted as a knife intended for practical use or as a magical charm (talisman) to be carried within a "medicine" pouch, we are unable to say.

### Acknowledgments

*I wish to thank Dave Walley, Peter Bush, Ron Hatfield, Tim Holder, and Elaine Holzapfel for their kind cooperation. Any shortcomings of these analyses, however, are not their responsibility and rest with me alone.*

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Figure 1. R. M. Gramly examines Cumberland point with residue on its base that Tim Holder (left) has brought to the Phil Stratton site, Logan County, Kentucky. Kirk Spurr photograph. November 2009.



Figure 2. Cumberland point with residue at base (arrow), belonging to Tim Holder. Length = 75.3 mm (about three inches). Raw material appears to be concentrically banded Ste. Genevieve chert. Kirk Spurr photograph.

Figure 3. Opposite side of Tim Holder Cumberland point showing short fluting. Kirk Spurr photograph.



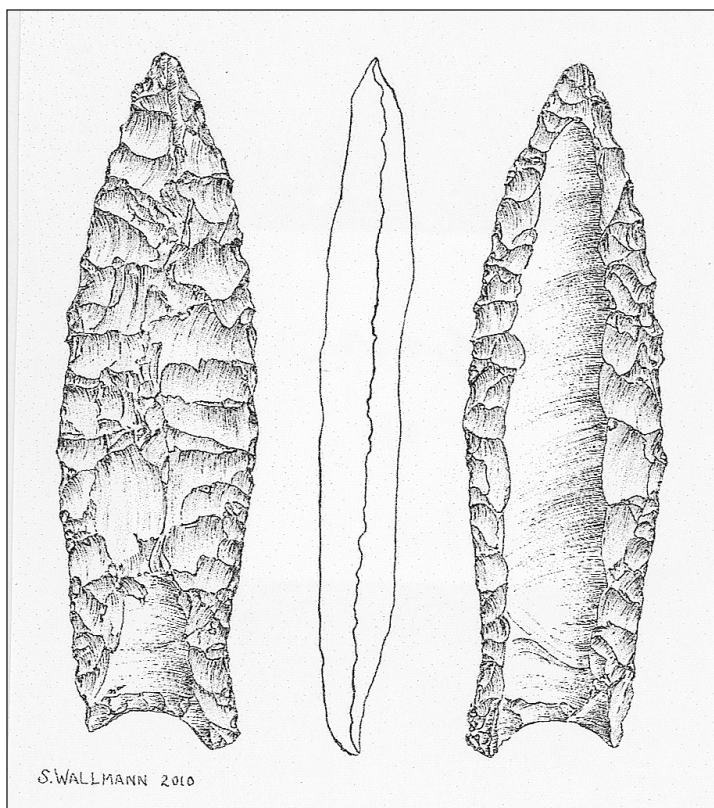


Figure 4.  
Illustration by Steve Wallmann  
of the Tim Holder Cumberland  
point from Logan Co., Kentucky.  
Length is 75.3 mm (about three  
inches). The point had been  
used with a broken ear, which  
to judge by the resin sheathing  
it, was damaged in antiquity.

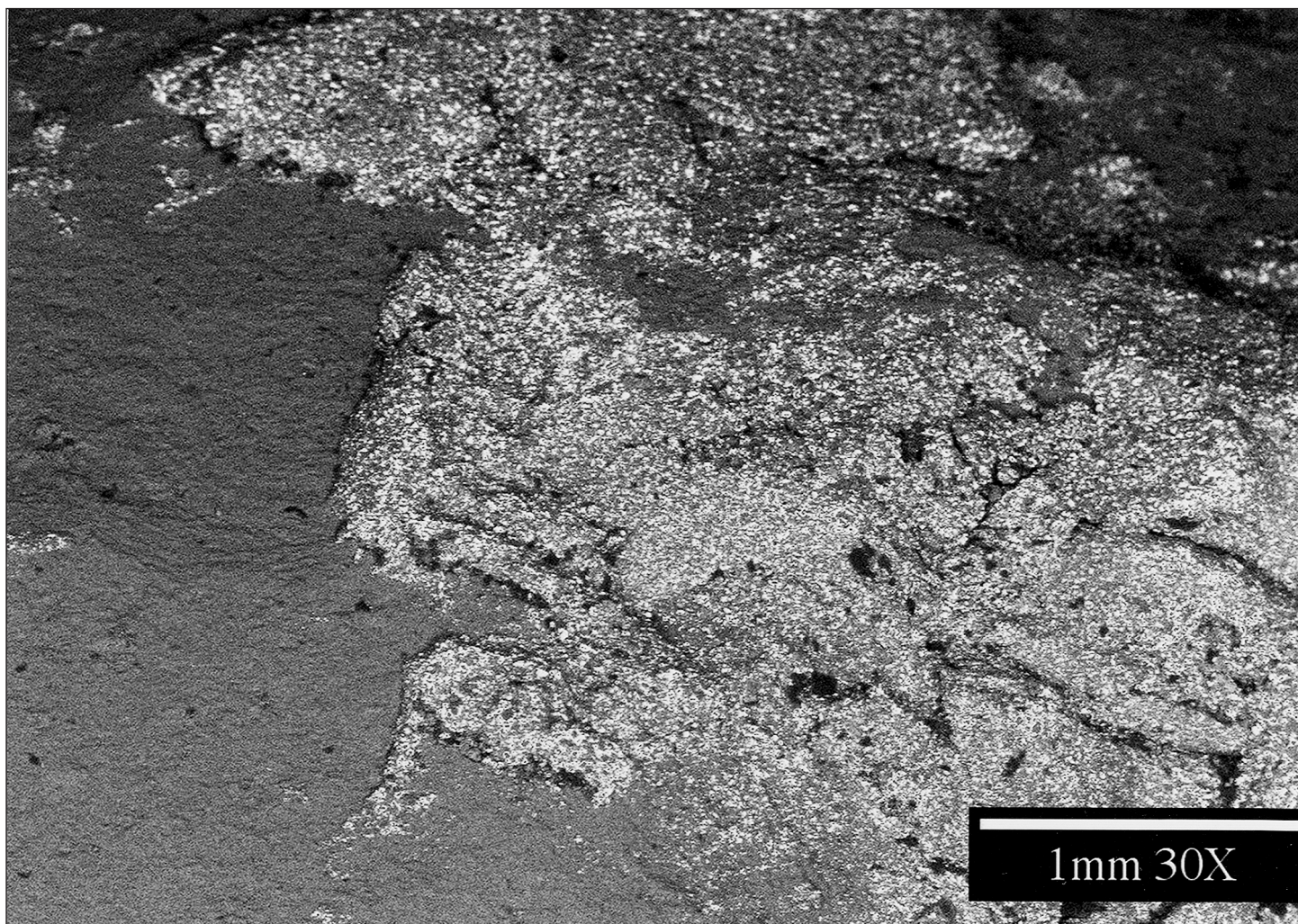


Figure 5. Scanning electron microscope (SEM) photograph at 30X of residue on the base of the Tim Holder Cumberland point. The small white particles are crystals of barite (barium sulphate).



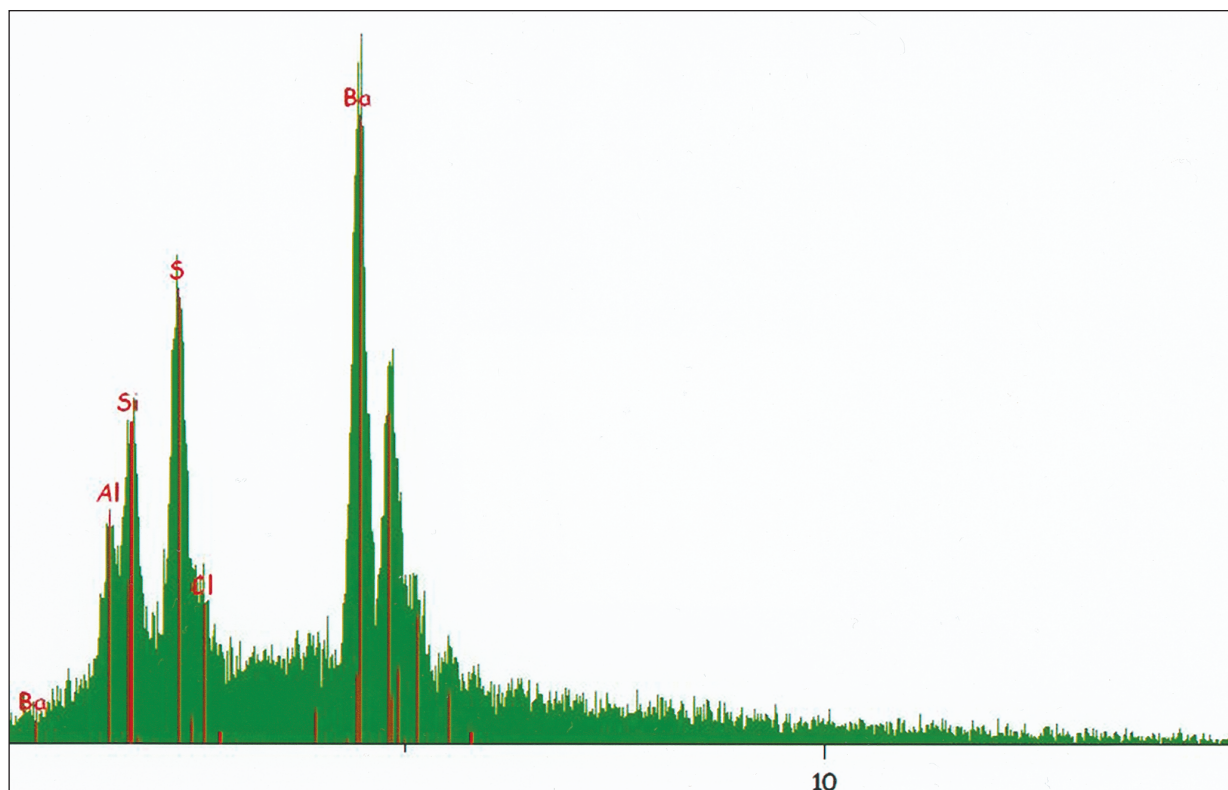


Figure 6. Elemental composition of white mineral particles embedded within organic binder upon the base of the Holder Cumberland point — as determined with the aid of a scanning electron microscope. Elements present (in decreasing order) are: Barium (Ba), sulphur (S), silicon (Si), and aluminum (Al). Lighter elements such as oxygen and carbon are not shown in this section of the graphical display (courtesy of Peter Bush).



Figure 7.  
Photograph of  
the Clovis point  
from Darke County,  
Ohio, after removal  
of ancient residue  
on its base for dating.  
Length = 78 mm  
(3<sup>1</sup>/<sub>16</sub> inches).  
Raw material is  
Vanport chert.  
R. M. Gramly  
photograph.





Figure 8.  
 Photograph of the  
 Clovis point from  
 Darke County before  
 removal of a stripe of  
 ancient residue (arrow)  
 for radiocarbon dating.  
 Elaine Holzapfel  
 collection.  
 R. M. Gramly  
 photograph.

Figure 9. Close-up photograph of an  
 ear of the Darke County Clovis point  
 showing stripe of reddish-brown residue.  
 Photograph courtesy of Peter Bush,  
 University of Buffalo Dental School.





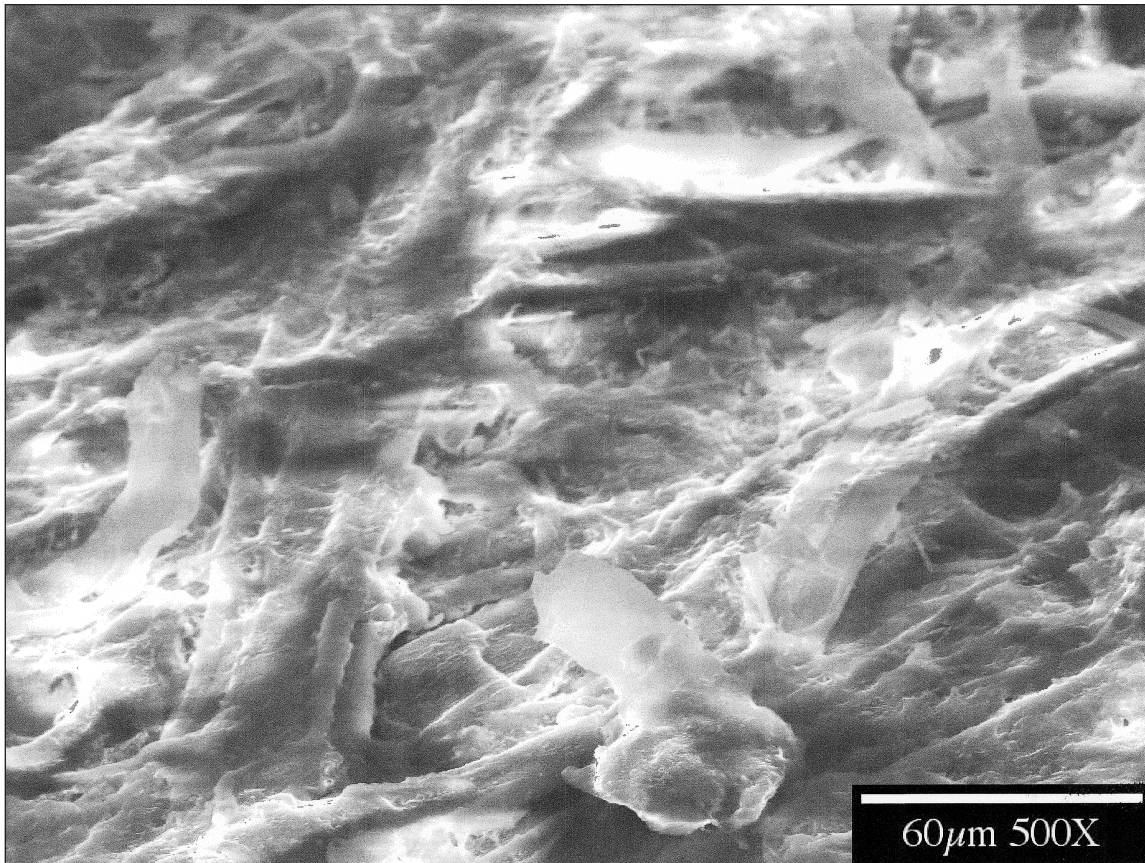


Figure 10. SEM photograph at 500X of flat fibers (sinew?) and their impressions upon residue at the base of the Darke County Clovis point. Courtesy of Peter Bush, University of Buffalo Dental School.

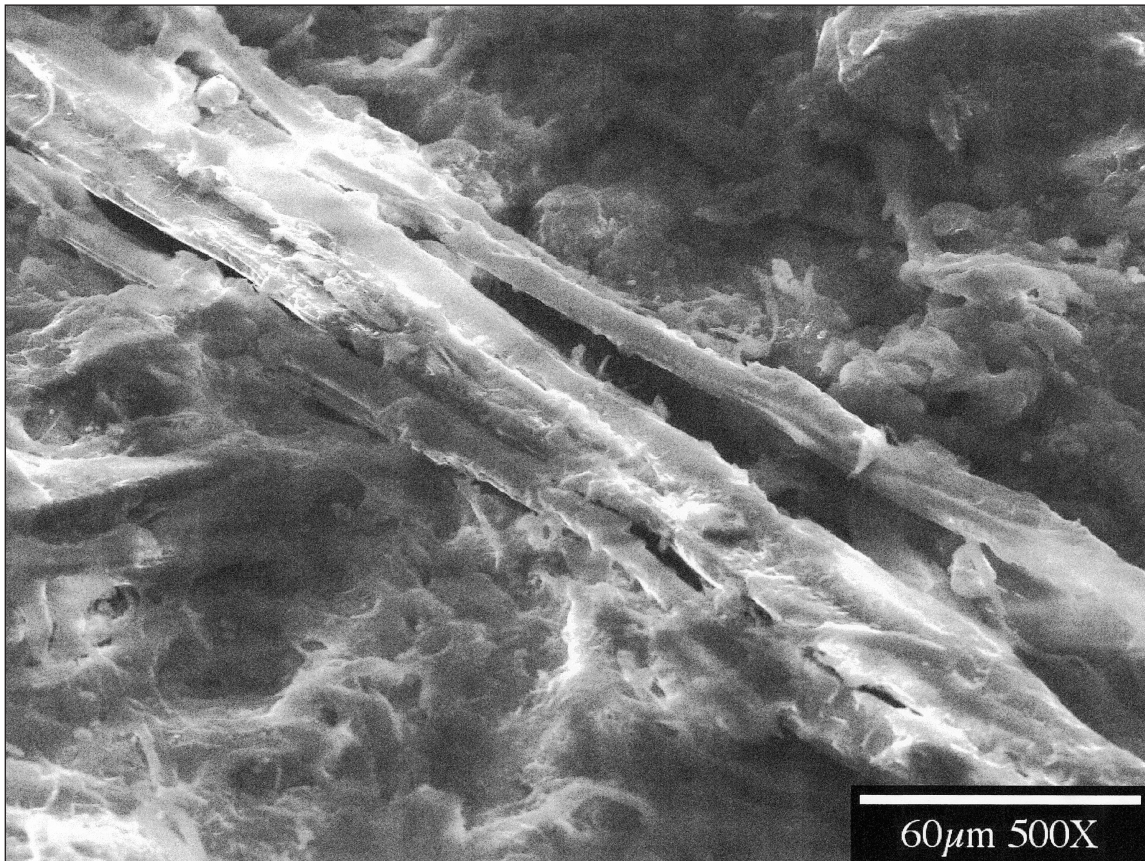


Figure 11. SEM photograph (500X) of rounded (plant?) fibers upon residue at the base of the Darke County Clovis point. Courtesy of Peter Bush, University of Buffalo Dental School.